Name: _____ Date: _____ **Unit 6 Class Work**

Forms and Zeros of Polynomial Functions Class Work

Objective: *You will be able to rewrite polynomial expressions given their zeros and/or to determine their zeros, as well as the multiplicity of each.*

Factor each polynomial completely to determine its zeros, as well as the multiplicity of each.

1. $2x^2 + 3x - 14$

2. $2x^4 - 162$

3. $^3x^4(x^2 + 14)^3 - 196(x^2 + 14)^3$

4. $x^2(x - 8)^3 - 64(x - 8)$

5. $2x^3 - 18x$

6. $3x^5 - 27x^4 + 60x^3$

★ State the zeros, as well as the multiplicity of each.
Then rewrite each polynomial in standard form, and identify the y-intercept.

7. $(x - 1)^2(x + 3)(x^2 - 9)$

8. $(x + 5)^2(2x - 3)(x + 1)$

9. $(x + 1)(x^2 + 25)(x^2 - 1)$

★ Write a polynomial function for each situation, based on the zeros. Write your functions in factored form, and then convert to standard form. Make sure all coefficients are integers! ☺

10. Zeros: 2 (M.2) and -¾

11. Zeros: -4, i (M.2), and ½

12. Zeros: -1, 1, -i, and i

13. Zeros: i, -i -1 (M.3) and $\frac{2}{3}$

★ Real World Problem Solving

14. At an airport, the sum of the length, width, and depth of a carry-on bag must not exceed 45 inches. Many carry-on luggage bags are designed in such a way that the depth is 5 inches shorter than the length. Determine the domain for the possible lengths of carry-on bags you can use at this airport, as well as the maximum volume your carry-on bag can have.

Write an expression for each dimension:

Write a polynomial:

Graph to determine the domain of lengths (x) and maximum volume (y).

15. Karen has 12 inch by 10 inch piece of cardboard that she would like to use to create a box she can use to carry sandwiches to distribute to the homeless when she visits a city. She plans on cutting the same size square out of each corner of the cardboard, and then folding up the sides, and she would like the box to have as high of a volume as possible. Help Karen determine the best dimensions for the square that she should cut out of each corner, as well as the maximum volume that this will allow for.

Find your Match! You either have a polynomial in standard form, a polynomial in factored form, or the zeros of a polynomial. Find the person (or two people) who you belong with!

Zeros: -3 (M.2), and 2	**$(x + 3)^2(x - 2)$**	**$x^3 + 4x^2 - 3x - 18$**
Zeros: -2, ½, and 2	**$(2x - 1)(x + 2)(x - 2)$**	**$2x^3 - x^2 - 8x + 4$**
Zeros: -3, 3/2, and 3	**$(2x - 3)(x - 3)(x + 3)$**	**$2x^3 - 3x^2 - 18x + 27$**
Zeros: 3 (M.2), and ½	**$(x - 3)^2(2x - 1)$**	**$2x^3 - 13x^2 + 24x - 9$**
Zeros: -3 (M.2) & 2(M.2)	**$(x + 3)^2(x - 2)^2$**	**$x^4 + 2x^3 - 11x^2 - 12x + 36$**
Zeros: 3 (M.2), and 2	**$(x - 3)^2(x - 2)$**	**$x^3 - 8x^2 + 21x - 18$**
Zeros: -3 (M.2), and -3/2	**$(x + 3)^2(2x + 3)$**	**$2x^3 + 15x^2 + 36x + 27$**
Zeros: -3 (M.2), & 3 (M.2)	**$(x + 3)^2(x - 3)^2$**	**$x^4 - 18x^2 + 81$**